2018 Level 3 Physics External Standards Material (from NZQA NCEA final standard versions as of Nov 21st 2015)

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| **P3.3 waves (AS 91523) 4 credits** | * Interference (quantitative) of electromagnetic and sound waves, * including multi-slit interference and diffraction gratings; * standing waves in strings and pipes; | | | * harmonics; * resonance; * beats; * Doppler Effect (stationary observer for mechanical waves) |
| *Relationships:* | | | |
| **P3.4 mechanics (AS 91524) 6 credits** | ***Translational & Circular Motion*:**   * Centre of mass (1 and 2 dimensions); * conservation of momentum and impulse (2 dimensions only) * Velocity and acceleration of, and resultant force on, objects moving in a circle under the influence of 2 or more forces, * Newton’s Law of gravitation, satellite motion   *Rotational Motion*:   * Rotational motion with constant angular acceleration; | * torque; * rotational inertia; * conservation of angular momentum; * conservation of energy   *Oscillating Systems*:   * The conditions for Simple Harmonic Motion, * angular frequency, * variation of displacement, velocity and acceleration with time, * phasor diagrams, * reference circles, * damped and driven systems, * resonance, * conservation of energy | | |
| *Relationships:* | | | |
| **P3.6 electrical systems (AS 90526) 6 credits** | *Resistors & Capacitors in DC circuits*:  * Internal resistance; * simple application of Kirchhoff’s Laws * Parallel plate capacitor; * capacitance; * dielectrics; * series and parallel capacitors; * charge/time, voltage/time and current/time graphs for a capacitor; * time constant; * energy stored in a capacitor   ***Inductors in DC circuits*:**   * Magnetic flux; * magnetic flux density; * Faraday’s Law; Lenz’s Law; * the inductor; | | * voltage/time and current/time graphs for an inductor; * time constant; * self inductance; * energy stored in an inductor; * the transformer  *AC circuits*:  * The comparison of the energy dissipation in a resistor carrying direct current and alternating current; * peak and rms voltage and current; * voltage and current and their phase relationship in LR and CR series circuits; * phasor diagrams; * reactance and impedance and their frequency dependence in a series circuit; * resonance in LCR circuits | |
| *Relationships:* | | | |